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Re: Request for information to inform how NRCS will implement funds received under the Inflation Reduction Act (87 FR 70770, Docket ID: NRCS-2022-0015)

Thank you for the invitation to submit comments on behalf of the World Wildlife Fund (WWF). As stated by NRCS in the request for comment, these Inflation Reduction Act (IRA) funds provide the agency with an unprecedented opportunity to implement practices and quantify greenhouse gas emission reductions. It is critical that NRCS leverage these funds not only towards practices and quantification for greenhouse gas (GHG) emissions reductions, but to scale practices and management systems that mitigate and adapt to climate change, enhance the resilience of the agricultural system, and improve measurement and quantification for climate and biodiversity outcomes.

There is great opportunity presented by the IRA funding, and also tremendous need to invest in solutions to challenges facing our food and agricultural system, challenges highlighted in WWF's Living Planet Report 2022, a comprehensive study of trends in global biodiversity and the health of the planet. This report revealed a very troubling average decline of 69% in species populations since 1970. While conservation efforts are helping, urgent action is required if we are to reverse nature loss. WWF's recent Plowprint report, showed a loss of 1.8 million acres of grassland habitat in the Great Plains of the U.S. and Canada in 2020 – acres plowed up primarily for row crop agriculture. This large-scale habitat loss continues to be a major contributor to the precipitous decline of songbird populations and other wildlife species throughout the Great Plains and a major loss of stored carbon and the opportunity to sequester additional carbon by those grasslands. NRCS should leverage this opportunity to create a shared vision with key US agriculture stakeholders to establish an actionable target for at least a 50% reduction in greenhouse gases emissions from agriculture by 2030 relative to 2005 levels, and net zero by 2040. Given the significant investments by the corporate sector to meet Science Based Targets with the new Forest Land and Agriculture (FLAG) guidance, this is a significant opportunity for USDA to partner with the private sector.

To affect positive change for climate, nature, and people, NRCS should leverage IRA resources to prioritize and enable a significant step forward for robust, regenerative, and resilient food systems. The funding of the IRA provides an unprecedented opportunity to advance innovations and scale approaches that can drive this positive change and enable the kinds of measurement and verification of outcomes that further enable recognition and reward ongoing progress. WWF offers the following recommendations in response to the agency's questions (included below in bold underline) to ensure and enable NRCS programs to address climate change, sustain biodiversity and nature, and support rural communities.

1) **What systems of quantification should NRCS use to measure the carbon sequestration and carbon dioxide, methane, and nitrous oxide emissions outcomes associated with activities funded through IRA?**
    - **How should NRCS design a scientifically based framework for field-based quantification and analysis that can integrate into USDA's Greenhouse Gas Inventory and Assessment Program?**
    - **What methods should NRCS use to quantify carbon sequestration and carbon dioxide, methane, and nitrous oxide emissions?**
    - **What sources of information should NRCS consider in developing protocols or what preexisting, standardized protocols should be used to support field-based data collection and analysis?**
    - **What types of field-based data should be collected and analyzed to assess carbon sequestration and reduction in carbon dioxide, methane, and nitrous oxide emissions outcomes associated with agricultural and conservation activities?**
    - **How should USDA monitor and track carbon sequestration and greenhouse gas emissions trends and the effects of NRCS supported activities?**
    - **How or should the framework developed by NRCS to provide field-based quantification integrate with satellite data to provide a comprehensive picture of GHG emissions and removals from agricultural activities and conservation practice implementation?**

Data and monitoring

Modernizing how NRCS collects, manages, analyzes, and interprets data is the foundation for delivering on the opportunity of IRA funding and nature-based solutions to climate. Modernized data infrastructure can enable US agriculture to much more accurately measure and monitor its footprint and develop and implement increasingly effective ways to reduce emissions, sequester carbon, and improve resilience. US farmers, ranchers, and forest landowners are uniquely poised to provide climate mitigation and adaptation benefits across the value chain. However, US agriculture as a system lacks a consistent, transparent, and scalable data infrastructure that builds farmer and rancher access to, and trust in, market-driven ecosystem services. Access and trust in a future system both require the ability to monitor actionable progress across their production systems on climate and other ecosystem outcomes.

NRCS should leverage the $100 million in IRA funding to build a data management, analysis, and insights infrastructure through a *National Agricultural Soil Carbon Plus Monitoring Network*. Such an infrastructure will integrate the best available science into next-generation information systems that is based on regionally specific and ecologically appropriate lists of practices and enables both advanced modeling techniques across scales

and actionable on-farm insights. A modernized data collection and monitoring infrastructure has the potential to drive meaningful impact in soil carbon sequestration and greenhouse gas emissions reductions. Additionally, such an infrastructure will be the foundation upon which either a modeling or measure/remeasure approach to quantification can benefit the value chain, through reduced cost in flexible systems and scalability to offer consistent programs no matter the geography. One example of success that NRCS should review is the Forest Inventory and Analysis (FIA) program, which has provided the forestry sector with high quality insight, analysis, and tracking of carbon metrics.

NRCS must lead a coordinated investment in a national nature-based solutions Network, which will advance and support the objectives of the Nature Based Solutions Roadmap and Resource Guide launched by the Biden-Harris Administration in November. **The science needed for robust, scalable, and credible nature-based climate solutions for the United States,** a multi-disciplinary advisory board formed by urban, rural, academic, and industry partners, provides excellent guidance. The outcome of a collaborative workshop of diverse experts, including WWF, in 2022, this report describes the technologies, tools and approaches necessary for robust, scalable, and credible nature-based climate solutions in the United States and provides a road map for actionable, cross-sectoral data and information to foster strategies that work. The key recommendations for the Network based on the report would be to develop:

- A centralized task force for priority setting, data standards, and data delivery;
- Robust ground-based monitoring and experimentation program;
- Rigorously benchmarked scaling tools that have well-defined uncertainty constraints in historic and future monitoring; and
- Regular protocol evaluation and certification.

To lead this coordinated investment, NRCS should:

- convene an advisory group of experts to identify the key criteria to be included in such a Network;
- be informed by and contribute data to current conservation programs, the Climate Hubs, and other relevant USDA initiatives; and
- continually seek out and connect to other data networks that meet the criteria for data quality and consistency.

For the purposes of IRA funding, the focus of the proposed Network is to build a robust infrastructure that contains historical and new soil carbon data. Samples collected prior to the start of a focused program would be considered historical soil carbon samples and would have classification that highlight potential uncertainty of data yet would be available to researchers and others to serve as directional and potentially baseline soil carbon.

The foundation of the Network would be a data collection campaign that would span five years, with the objective being to drive a significant number of samples spanning key geographies and moving regionally across time. An example of how to plan, manage, and model in situ samples at scale would be in 60,000 sampling sites across the US would be sampled, at a rate of 12,000 sites per year. The Network infrastructure would be built around

this framework, taking into consideration field sampling and laboratory techniques and challenges, uncertainty bounds based on the sampling at each site, consistent sample depths across all sites, and the spatial context that enables insights. Spatial data that enables advanced modeling techniques would include existing data: soil survey geographic database (SSURGO), National Elevation Dataset (USGS NED), Major Land Resource Area (MLRA), as well as existing conservation data from NRCS programs. One significant driver of a Network that contains all conservation programs in one place should be to connect measurable outcomes for conservation practices to government funding programs that today have no universal and reliable baseline data against which to measure and define success.

While building the Network as a soil carbon platform, NRCS and partners must explicitly create its architecture to enable future collection of additional metrics for broader soil health and indicators of ecosystem health. Building on this infrastructure would require understanding the complexities to additional data such as ecosystem metrics (soil stability, soil compaction, bare ground, plant diversity and abundance, plant productivity, water retention/infiltration, grassland bird and pollinator diversity and abundance), water quality impacts, and conversion rates of grassland to cropland, among others. While beyond the scope of this network, it is important to understand that translation of soil carbon measurements to something actionable requires information about land use management practices (current and historic). It will be important to create and structure this network in ways that projects and models that have this management information can access and contribute data to generate that fuller picture.

2) How can NRCS engage the private sector and private philanthropy to leverage the IRA investments, including for systems of quantification?

Technology transfer and accelerated innovation adoption hub:
NRCS and USDA have invested considerable resources over the past two decades, with significant new funding because of the IRA and Bipartisan Infrastructure Legislation (BIL), in research and grant programs dedicated to developing and advancing innovative approaches to agricultural conservation efforts. This includes the Conservation Innovation Grant Program, the Partnerships for Climate Smart Commodities Program, the Regional Conservation Partnerships Program, as well as investments in the Agricultural Research Service and countless partnerships with universities and other partners.

Despite ongoing effort, we have yet to see meaningful transition of innovations out of these programs into widespread programmatic implementation. **To address this gap, we recommend NRCS leverage the opportunity of the IRA to create a dedicated program to support systematic identification of scalable innovations and integration of those approaches into broader USDA programs to improve outcomes for climate, biodiversity, protection of sensitive ecosystems, and water quality and quantity**. NRCS should create an advisory group pulled from academia, the private sector and philanthropy to provide input on opportunities for further investment and engagement to scale and ensure success.

We recommend NRCS create a new dedicated team of staff (hub) focused on systematically identifying and transferring technologies, systems, and learning methods from CIG, PCSC, ARS, universities, and other partners and incorporating those learnings into programs, technical assistance, educational approaches, technical standards, and conservation planning. The NRCS innovations tech transfer team should deliver regular reports on progress to document incorporation of innovations into NRCS and FSA programming and standards. The reports will serve to communicate progress to stakeholders broadly.

3) **How should NRCS target IRA funding to maximize improvements to soil carbon, reductions in nitrogen losses, and the reduction, capture, avoidance, or sequestration of carbon dioxide, methane, or nitrous oxide emissions, associated with agricultural production?**

Prioritize Conservation and Restoration of Grasslands:
The Central Grasslands span across than 600 million acres of North America and are home to both diverse ecosystems and equally diverse human communities. This short- and mixed-grass prairie is one of only four remaining intact temperate grasslands in the world, and yet this precious ecosystem is being plowed up at an alarming rate of almost 2 million acres a year. Row crop agriculture has driven most of this conversion.

NRCS can reduce the climate footprint of agriculture, address the conversion crisis in the Central Grasslands, and support the vitally important ranching and Indigenous communities that thrive on the grasslands by investing IRA resources in protecting, enhancing, and restoring this critical ecosystem. These actions will advance both climate and biodiversity goals, as grasslands and other natural systems sequester vast amounts of carbon from the atmosphere and protect them from conversion to cropland agriculture, protecting enormous existing carbon stocks while also allowing for continued and ongoing sequestration. Additionally, preventing conversion of natural lands is critical for protecting biodiversity, wildlife habitat, and freshwater resources, which in turn benefit ecosystem health, communities, and downstream agriculture that depends on that water.

Overall, NRCS should ensure the Central Grasslands, a critical landscape that has not received sufficient funding given its need, is a priority for funding under the IRA and within its technical assistance allocation. This applies to the Environmental Quality Incentives Program (EQIP), Agricultural Conservation Easement Program (ACEP), Conservation Stewardship Program (CSP), and Regional Conservation Partnership Program (RCPP). NRCS must ensure that eligible practices for grasslands are included in these programs. Furthermore, NRCS should coordinate and collaborate with the Farm Services Agency (FSA) to ensure the Conservation Reserve Program (CRP) can also play a much greater role in advancing Central Grasslands conservation objectives.

NRCS should leverage the unprecedented opportunity of IRA funding to take much needed action for the Central Grasslands (see map below) by launching a new, strategic initiative to protect, restore, and improve management of grasslands in the region. Following the example of the Sagebrush Initiative, NRCS should create a new initiative building upon the extensive work of the Central Grasslands Roadmap, a highly collaborative effort from eight

diverse sectors spanning the Central Grasslands that identified shared principles and priorities to address pressing challenges to human community health and healthy grassland ecosystems across the biome. The recently released Central Grasslands Assessment Map should be used to guide where voluntary conservation investments are needed, with emphasis on maintaining and growing core grassland areas. Given the urgency and importance of protecting and conserving the Central Grasslands and the grass-based economies and communities that depend upon it, NRCS should not only leverage the opportunity of the agency's funding under the IRA but work with the Secretary and other key USDA agencies, in particular the Farm Services Agency, to engage and coordinate with additional critical programs as part of this effort. This initiative should receive dedicated funding from EQIP and CSP, as well as acres from Grassland CRP, for the following:

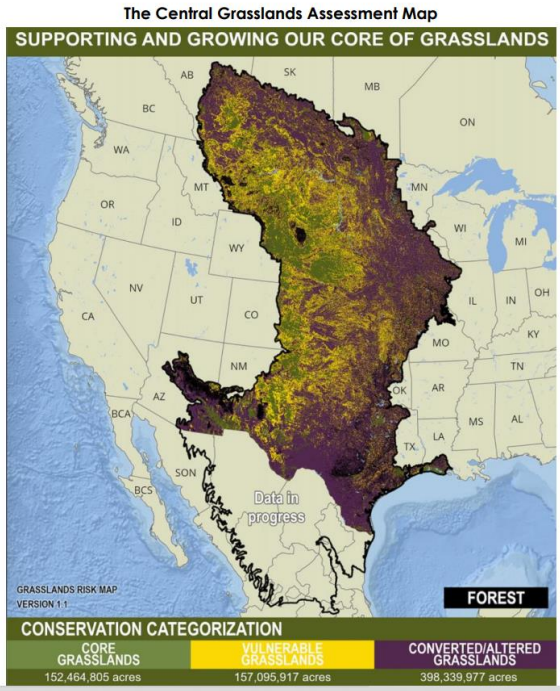
- Develop an educational campaign focused on grasslands conservation and sustainable ranching in the region. The educational campaign could include creating a communication and outreach toolkit for stakeholders to use in various settings (supply chain engagement, community engagement, consumer education, K-12, and more) to increase awareness about the importance of healthy grasslands; developing opportunities and systems to share science, success stories, best practices, trainings, and learning across the Central Grasslands (such as supporting creation of a training bureau that prioritizes local and Indigenous knowledge, peer-to-peer learning, and intergenerational mentorship); and catalogue and celebrate current ranchers' and producers' efforts. NRCS should leverage the extensive expertise and engagement of the stakeholders involved in the Central Grasslands Roadmap and draw upon and apply lessons learned from the educational initiatives under the Sagebrush Initiative, Working Lands for Wildlife, and other similar efforts.
- Work with FSA to leverage Grassland CRP to optimize outcomes for grasslands, ranchers, climate, and biodiversity:
    - Expand Grassland CRP (which focuses on the conservation of grassland specifically) to include options for longer (i.e., 30-year) enrollments. This would enable USDA to ensure that the climate and environmental benefits of conserved lands remain protected for longer periods and enable transition into more permanent protection.
    - Designate the Central Grasslands as a Priority Zone under the Grassland CRP National Priority Zones, making offers within the region eligible to receive an additional 15 ranking points and $5 per acre if at least 50% of the offer is in the zone.
    - Establish "core areas" and "vulnerable areas" of the Central Grasslands Priority Zone and provide additional priority ranking points for these areas. Core areas should be in areas where data shows there are grassland strongholds -- intact grasslands critical to maintain and protect, both ecologically and in terms of the viability of grass-based economies that help rural communities thrive – and "vulnerable areas," should be in areas where data show high risk of conversion to cropland, as well as high risk of woody

species encroachment and/or invasive species impacts. These core and vulnerable areas should receive priority for the extended 30-year contracts described above. Protecting these vulnerable areas is essential to slowing conversion and providing a buffer around the intact core areas.[1]

    - Create a pilot program to explore the use of livestock to improve soil health in CRP fields and allow for a rental rate over and above the CRP payment to be made to the producer. Scientific studies have demonstrated the benefits of sustainable animal management in maintaining the health of grasslands. This program would seek to determine the impacts and benefits of this pilot program, for consideration in subsequent iterations of the Farm Bill or conservation legislation. This is a recommendation elevated in Gaining Ground by the Native Farm Bill Coalition.
- Create an expanded, sustained black-footed ferret initiative across the Central Grasslands, building on the existing work in Colorado, with coordinated and consistent eligibility and enrollment goals across the region. Black-footed ferrets are one of the most endangered mammals in North America and are the only ferret species native to the continent. Their recovery in the wild signifies the health of the grassland ecosystem which they depend on to survive. The initiative should provide technical and financial assistance for willing landowners to maintain ranch land in prairie habitats and the livestock operations and/or bison pastures that they support, while also providing for the conservation and recovery of several wildlife species associated with prairie dogs. This should include Native Nations, who play a disproportionate role in black-footed ferret recovery. This black footed ferret initiative should provide:
    - Longer term contracts with opportunities for renewal (5+ years) to accommodate the time needed to build and retain ferret habitat (i.e., prairie dogs),
    - Incentives for foregone forage and other practices that encourage and support landowners to maintain prairie dogs,
    - Ability for Native Nations, Federally Chartered Indian Organizations, Tribally recognized entities, Tribal Economic Development Corporations and Community Development Corporations, and inter-tribal organizations to access assistance for engagement on tribal lands, not just individual producers;

[1] Analysis behind the Central Grasslands Assessment Map is based on the Plowprint Report, the Olimb and Robinson conversion risk model, the Rangeland Analysis Platform, and Twidwell et al. Rangeland Informatics. This analysis maps core grassland habitat, area under threat of conversion or encroachment of trees/woody shrubs, and area already converted/encroached, and the framework is modeled on the successful approach of NRCS's Working Lands for Wildlife Sage Grouse Initiative.

    - Technical assistance, including help with applications.
- Within EQIP, prioritize improved grazing management, including a focused component on bison management (including technical and ITEK adaptations as needed) and enhance the impact of the program's incentives for woody invasives removal by enabling ranchers to seek assistance for woody encroachment at 10% cover in all Central Grasslands states. Some states set the threshold at 20%, at which point management is much more difficult.
- Across the initiative, provide dedicated outreach, education, and technical assistance for both tribal and non-tribal ranchers, including liaison between BIA and USDA to ensure effective engagement and participation of Native Nations.



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Prioritize practices/systems with co-benefits:
USDA must ensure that the US agriculture sector prioritizes a reduction in its greenhouse gas footprint, especially those interventions that have co-benefits for biodiversity, water, and soil health. Significant reductions can be readily achieved now through scaled adoption of regenerative farming systems, sustainable forest management, preventing conversion, improved farm nutrient management, better manure management, improved grazing management, shifts to renewable energy, deployment of proven innovation and technologies, and reduction of loss and waste throughout the farm system.

Building on this need to address climate, NRCS should leverage the opportunity of IRA funding to prioritize conservation practices that provide co-benefits for biodiversity, wildlife habitat, water quality, groundwater recharge, maintaining environmental flows, and flood and drought mitigation in addition to carbon sequestration and emissions reductions. Given that the effectiveness of conservation practices for achieving desired conservation outcomes varies by ecoregion, soil type, etc., NRCS should develop regionally specific and ecologically appropriate lists of practices that qualify for IRA funding. NRCS should also discontinue cost share support for planting invasives that ultimately result in encroachment and the need for subsequent investment to control or remove those invasives, as is the case with woody encroachment in the Central Grasslands. Furthermore, NRCS should require certain co-benefits in areas where there is specific degradation. For example, in places where water quantity is a core concern, then the IRA related project should be designed to address implications for water quantity and carbon as the starting point, not just acknowledge co benefits secondarily.

These established programs already provide payments to farmers for the adoption of several agroecological practices that help sequester carbon and reduce greenhouse gas emissions. USDA should prioritize improving these existing programs to reduce barriers to the adoption of these practices, increase funding for the most impactful climate-smart practices including agroforestry, improved nutrient management, improved grazing management, and diversified cropping rotations. USDA should increase incentives and technical support for alternative feed grains and feed innovations for livestock and poultry that increase crop diversity and are drought tolerant, require less inputs, and have a lower environmental footprint overall. This should include incentives that support sustainable production by farmers who grow them and on-farm storage by livestock and poultry operations who use them as feed. Integrating climate as an explicit goal of these programs can help these payments support practices with the largest impact on climate, while also promoting co-benefits to water quality and biodiversity. Temperate grasslands rank third in the world for soil carbon storage capacity, after wetlands and boreal forests. USDA should facilitate practices that maximize soil carbon storage of grasslands, as well as wetlands and forests, minimize the risk of additional carbon losses through conversion, and enhance carbon sequestration through diverse species composition on private lands, in both cropland and in reseeding native grasslands.

In addition, NRCS should leverage IRA funding to prioritize and increase adoption of critical practices and systems that will enable farmers to adapt to and become more resilient in the face of climate change, including in water stressed regions like the Rio Grande/Rio Bravo. Resilience is location specific, so appropriate practices and systems need to be tailored to the landscape or basin to be effective. On the specific and increasingly pressing challenge of water stress, NRCS should use the opportunity of IRA funding to advance agricultural water management as dual purpose – efficient use of water for crop production and using suitable lands to replenish groundwater when major precipitation events occur (including on-farm recharge via appropriate timing, duration and amount of water under different cropping systems), creating recharge

basins, and incentivizing wetlands, floodplains and riparian corridors that can soak up and infiltrate excess precipitation. NRCS can leverage IRA funding to advance these objectives by expanding the EQIP-WaterSmart Initiative to include recharge planning, implementation and monitoring and including in the Conservation Innovation Grants program targeted funding for developing land repurposing programs, which should be developed on a coordinated, regional basis. With all of these programs, NRCS should ensure program participants use approved, transparent methodologies to verify water savings.

Regenerative Ag Higher Tier of Conservation and Technical Assistance:
Over the past decade, the challenges confronted by the nation's farmers, ranchers, and forest landowners have grown considerably as have the impacts on the environment. NRCS has a great opportunity with IRA funding to invest in not only how it delivers technical assistance, but the outcome it is striving for with its delivery system overall. We recommend that NRCS leverage the opportunity of IRA resources to update and upgrade its technical assistance approaches and objectives within a strategic pilot to reach a new tier for agriculture: regenerative agriculture. This is not about a new name, but a new scope and outcome for farming and ranching. Within a focused pilot, NRCS should, in consultation with key stakeholders, adopt a definition of regenerative agriculture as a higher tier/level of conservation in agriculture (farming and ranching) that strongly incorporates climate adaptation, resilience, and biodiversity. This definition of regenerative agriculture reflects the new challenges faced by agriculture (farming and ranching) and the need to enable and empower farmers and ranchers to meet these challenges and become more resilient in the face of climate change/more extreme weather and meeting the needs of planetary and human health. This definition and the level of resilience it advances will build upon sustainable agriculture and advance the next tier of outcomes. Regenerative agriculture connects the farm or ranch with its landscape context in an integrated and holistic fashion, addressing multiple resource concerns, and achieving multiple benefits.

The new initiative would include:

- Use of the definition of regenerative agriculture to guide higher tier conservation planning at the farm/ranch and watershed/landscape scales.
- Development of advanced-level technical and planning guides, including conservation action plans (CAPs) and technical standards for regenerative ag implementation. These regenerative ag action plans, guides and standards will be used for the higher level NRCS conservation programming, financial assistance, and technical assistance, and guidance for technical assistance training for regenerative ag implementation.
- Roll-out of the new regenerative ag tier of conservation planning, technical assistance training, and technical guidance initially in priority landscapes, to include but not be limited to the Central Grasslands and the Rio Grande/Rio Bravo. Implement the pilot within 18 months and provide a report summarizing the changes and outreach to deliver this new approach.

- After rolling out in these initial landscapes, expand the regenerative agriculture tier as an option in 1-2 new priority landscapes every 1-2 years.

While recognizing that NRCS will need to undertake a multi-stakeholder process to develop and refine the definition of regenerative agriculture, WWF offers the following definition based on extensive traditional ecological knowledge and modern science:

- **Regenerative Agriculture:**
    - **Recommended Definition:** We acknowledge and honor that over thousands of years, Indigenous People have developed, evolved, and continue to advance regenerative agriculture. It is a holistic and place-based approach to agriculture that increases biodiversity, protects water ecosystems, builds soil health, mitigates, and adapts to climate change, while also supporting producers and communities to thrive; and producing nutritious food.
    - **Principles:** Implement within the context of the landscapes, ecosystems, and communities that agricultural production is a part of:
        - End conversion of ecosystems, including grasslands, wetlands, and forests
        - Actively improve biodiversity and restore species' habitats and the ecosystem services they provide.
        - Steward water for healthy rivers, watersheds, groundwater basins, and seascapes,
        - Understand and proactively manage and adapt to climate risks.
        - Respect cultures, elevate the voices of historically underrepresented producers, and support community-led solutions with diverse stakeholder engagement.
        - Support and transform crop and grassland management to be in dynamic relationship across ecosystems and people.
        - Improve producer livelihoods, farm and ranch viability, and rural economies.
        - Build in circularity and full product utilization.
    - Within a place-based context, improve:
        - Biodiversity, intact ecosystems, and habitat
        - Water balance and quality
        - Soil health
        - Climate change mitigation and sequestration
        - Resilience to climate change
        - Producer livelihoods and rural economies
        - Nutritious food production, circularity, and accessibility

Improve engagement of Native Nations, Tribal organizations, and Tribal communities, and Tribal producers in conservation programs:

As recommended by the Native Farm Bill Coalition's Gaining Ground report, NRCS should explicitly allow a Tribe or a group of Tribes within a state or region to develop traditional, ecological, knowledge based (TEK) technical standards that will guide the implementation of all conservation projects allowed under the Farm Bill. This is to expand access to and participation in NRCS programs in Tribal jurisdictions, complementing the use of existing technical standards. NRCS should leverage IRA funding to engage NRCS Science and Technology to work with Native Nation representatives to develop guidance and a process to enable and accelerate codification of current NRCS practices that include and encourage TEK-based conservation and further recognize the fact that Tribal jurisdiction and use of traditional practices to improve conservation project implementation are decisions best left to Tribal governments and individual Indian producers who live on those lands and are engaged in ongoing activities that are designed to improve environmental conditions, habitats, and their lands for agricultural purposes. The team would identify and recognize that these TEK-based standards already have a solid scientific basis and are acknowledged by various federal research organizations and agencies. USDA committed to recognizing TEK in the Department's 2022 Equity Action Plan. Incorporating Indigenous Knowledge is further supported by the recent Indigenous Knowledge Guidance for Federal Agencies, OSTP-CEQ Indigenous Knowledge Guidance, and Implementation Guidance for Federal Agencies. The agency could use IRA funding to follow through on this current commitment to hire individuals with TEK expertise and leverage NRCS's Science and Technology leadership to explore opportunities for Tribes to engage in Alternative Funding Arrangements to specifically implement TEK practices under existing Conservation programs.

In addition, we encourage NRCS to address the significant challenges Tribes face in meeting federal match requirements, given the degree to which Tribal funding is federal and so ineligible as match. Whenever possible NRCS should reduce or waive match or cost share requirements under the IRA to increase access to and participation by Tribal interests in NRCS conservation programs.

Food Loss and Waste:
Food loss and waste is another significant opportunity to deliver climate benefits and more. The United States produces and imports an abundance of food each year, but approximately 35% of it goes unsold or uneaten. Annually, 80 million tons of surplus food are not consumed. Of this, 54.2 million tons go to landfill or incineration, or are left on the fields to rot. Farmers, manufacturers, households, and other businesses in the United States spend $408 billion each year to grow, process, transport, and dispose of food that is never eaten. This waste carries with it enormous economic, environmental, and social costs, but also represents great opportunity.

Highly relevant to NRCS and to IRA funding is the loss of crops in the field. No Grain Left Behind: Harvest Efficiency and Post-Harvest Loss, a 2022 report by WWF, used baseline

primary data from a sample of farms to reveal average field-level loss on select corn and soy farms in the US. Corn farms in the study had an average field-level loss of 4.7%, whereas farmers expected 0.65% loss. Extension agents encourage farms to have less than 1% loss. A publication from the University of Kentucky cites average losses of up to 5%. This means a loss overage of 3.7%, which if scaled to the national level, means there is potentially a loss of as much as 507 million bushels of corn worth $2.1 billion, based on 2019 production figures and prices. For soybeans, farms in the study had an average loss of 4.5%, whereas 3% is the accepted industry loss. Publications from Penn State University Extension found average soybean losses of 5% and Michigan State University Extension found soybean losses of 10% are common and can reach 15%. This means a loss overage of 1.5%, which if scaled to the national level equates to a potential loss of up to 53 million bushels of soy worth $0.53 billion. Applying this study's loss rates across the total corn and soy acreage in the US would amount to a projected area of land that is four times greater than what was converted to cropland in 2018 across the Great Plains. The most significant factors in determining the level of loss across farmers were type of equipment and level of combine operator experience. These losses not only impact farmers economically but have significant greenhouse gas and biodiversity impacts as well, as reducing loss can reduce the acres needed to produce the same crop output.

- Expand education and technical assistance for farm operators to properly set, maintain and fine tune their combines to help minimize harvest losses. USDA should leverage IRA funding to develop and distribute information and training materials to farmers/farm operators; support trainings via grower associations, conservation districts, and cooperative extension; and expand technical assistance to help farmers make needed adjustments to their equipment and learn from experiences of well-seasoned combine harvesters. NRCS should develop partnerships with makers of harvesting equipment, extension, and other experts to deliver this training effectively and to expand reach and impact.
- NRCS can further help farmers reduce yield loss by providing cost share, grants and loans for precision harvesting equipment and technologies. Precision harvesting equipment uses advances such as sensors to automate combine setting and adjustments based on real world conditions, sensors to track grain loads and update yield calculations, autosteer and automatic guidance to improve efficiency, and data collection and management to improve overall tracking and understanding of where and how to make further improvements. NRCS should also explore opportunities to enable farmers to share precision harvest equipment, given the significant investment would be valuable to extend across multiple farmers if they choose to work in coordination, such as via a custom harvest arrangement. NRCS should also extend this kind of investment to support infrastructure and implement needs for regenerative practice transition such as cover crop inter-seeding and specialized equipment, which is highly complementary to

precision harvest equipment. This could be coordinated through extension offices, who could then engage the growers in their region.

- NRCS should provide resources to enable farmers to reduce crop loss in storage by providing cost share and funding for technologies and training to use equipment to better maintain and preserve the condition of grain stored on-farm. These technologies include remote visibility, remote control and automation of the fans used to circulate air through the stored grain or oilseed to keep it in top quality condition while stored on-farm. NRCS should provide opportunities for farmers to trial technologies with the private sector so they can evaluate economic benefits and the value of a longer-term investment.

4) How should NRCS streamline and improve program delivery to increase efficiency and expand access to IRA funded programs and projects for producers, particularly underserved producers?

Conservation Technical Assistance

To meet the needs of today's increasingly diverse farming and ranching populations and the conservation challenges they face, NRCS should leverage IRA funding to make significant updates and improvements to how it delivers technical assistance. This includes not only hiring additional NRCS staff to fill capacity gaps but updating how those staff are trained to optimize the effectiveness of TA delivery. It is critical to ensure that TA is effective in communicating effectively with today's farmers, forest landowners, and ranchers and taking advantage of advances in science, technologies, and understanding how people learn, including behavioral science. Two excellent organizations regarding behavioral science NRCS should engage as expert advisers include Center for Behavioral & Experimental Agricultural Research (CBEAR) and Evidn.

Leveraging IRA funding, NRCS should work with key advisors such as CBEAR and Evidn, as well as additional expert advisors, to revise and update the agency's approach to staffing and technical assistance to meet the needs and learning approaches suited to today. This process should include learning and technical assistance experts as well as the target audience, farmers, ranchers, and forest landowners that represent all sizes and backgrounds, to develop new training approaches and curriculum. How NRCS trains its staff and technical assistance partners is a key opportunity for the agency to introduce and advance new conservation measures, introduce and advance behavioral science into training methods, manuals, introduce new regenerative ag approaches, including the reduction of loss. These curricula are also a key place to coordinate advancement of new technology transfer approaches – new approaches to learning from innovation programs (CIG, Climate Smart Commodities, Climate Hubs, etc.) and bringing successful approaches into training and into routine implementation, as recommended above. Revising curricula is essential to ensuring the agency can effectively engage communities like Native Nations. As part of this process, NRCS should consult with State Technical Committees to identify where specific staffing shortages and/or staff knowledge gaps are causing critical bottlenecks and prioritize filling these roles and providing necessary training to staff.

Native Nations engagement:
As has been highlighted by the Native Farm Bill Coalition (NFBC), NRCS faces a critical gap in effectively reaching and engaging Tribes and Native Nations. Tribes and Native Nation are a leading force in American agriculture, with more than 80,000 individual Native producers contributing $3.5 billion to the U.S. economy. Yet, the unique needs of Tribal Nations and Native producers have been historically overlooked. NRCS can leverage IRA funding to help meet Tribal and national conservation needs by improving understanding of what programs are available and how Tribes and Native Nations can access those programs. NRCS should create a clearinghouse dedicated to communicating with Tribes and Native Nations, cataloging clearly what programs tribes and native led organizations can apply for, what those programs provide, how to apply, what funding is available, and who to contact for assistance. NRCS should appoint additional staff to serve as liaisons for those submitting applications and in need of assistance. Finally, NRCS should evaluate opportunities to work with a more diverse suite of Tribal entities engaged in conservation, agriculture, and food sovereignty projects to advance the adoption of NRCS supported practices and programs to the greatest degree possible.

5) **How can NRCS expand capacity among partners to assist in providing outreach and technical assistance to support the implementation of IRA funding?**

NRCS should leverage IRA funding to engage partners to provide critical staffing for climate and habitat restoration initiatives to advance priority programming and initiatives, especially to support the expansion of regionally specific and ecologically appropriate approaches and systems. NRCS currently has partner arrangements with a diverse set of organizations, getting great value out of these arrangements. Staff from partner organizations advance NRCS objectives, bringing their significant expertise and knowledge to the table and strengthening the partnership with those organizations as well. We recommend that NRCS expand use of this approach along with IRA funding priorities to meet technical assistance needs, especially to fill gaps in NRCS expertise and to expand understanding and adoption of regionally specific and ecologically appropriate approaches and systems. Additional capacity could be explored under the Intergovernmental Personnel Act.

We look forward to working with you on this critical effort.

Respectfully submitted,

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